

Title 159 - STATE FIRE MARSHAL

Chapter 7 - RELEASE DETECTION REQUIREMENTS

001. GENERAL REQUIREMENTS FOR ALL UST SYSTEMS.

Owners and operators of new and existing UST systems must provide a method, or combination of methods, of release detection that:

001.01. Can detect a release from any portion of the tank and the connected underground piping that routinely contains product;

001.02. Is installed, calibrated, operated, and maintained in accordance with the manufacturer's instructions, including routine maintenance and service checks for operability or running condition; and

001.03. Meets the performance requirements in §004 or §005 of this chapter, with any performance claims and their manner of determination described in writing by the equipment manufacturer or installer. In addition, methods used after January 1, 1991 except for methods permanently installed prior to that date, must be capable of detecting the leak rate or quantity specified for that method in §§004.02, 004.03 and 004.04 or §§005.01 and 005.02 of this chapter with a probability of detection of 0.95 and a probability of false alarm of 0.05.

001.04. When a release detection method operated in accordance with the performance standards in §§004 and 005 of this chapter indicates a release may have occurred, owners and operators must notify the State Fire Marshal within 24 hours in accordance with §006.01B in Chapter 6.

001.05. Owners and operators of all UST systems must comply with the release detection requirements of §§004.01 and 004.02 of this chapter. All other release detection requirements must be complied with by December 22 of the year listed in the following table:

Schedule for Phase-in of Release Detection

Year System Was Installed	Year When Release Detection is Required (by December 22 of the year indicated)				
	1989	1990	1991	1992	1993
Before 1965 or date unknown	RD	P			
1965 - 1969		P/RD			
1970 - 1974		P	RD		
1975 - 1979		P		RD	
1980 - 1988		P		RD	
New Tanks (after January 1, 1989)		Immediately upon installation			

P = Must begin release detection for all pressurized piping in accordance with §002.02A and §003.02D below.

RD = Must begin release detection for tanks and suction piping in accordance with §002.01, §002.02B, and §003 below.

001.06. Any existing UST system that cannot apply a method of release detection that complies with the requirements of this section must complete the permanent closure procedures in Chapter 10 by the date on which release detection is required for that UST system under section 001.05 of this chapter.

002. REQUIREMENTS FOR PETROLEUM UST SYSTEMS.

Owners and operators of petroleum UST systems must provide release detection for tanks and piping as follows:

002.01. Tanks. Tanks must be monitored at least every 30 days for releases using one of the methods listed in §§004.04 through 004.08 below except that:

002.01A. UST systems that meet the performance standards in Chapter 4 or Chapter 5, and the monthly inventory control requirements in §004.01 or §004.02 of this chapter, may use tank

precision testing (conducted in accordance with §004.03 below) at least every 5 years until December 22, 1998, or until 10 years after the tank is installed or upgraded under §002 in Chapter 5, whichever is later;

002.01B. UST systems that do not meet the performance standards in Chapter 4 or Chapter 5 may use monthly inventory controls (conducted in accordance with §004.01 or §004.02 of this chapter) and annual precision testing (conducted in accordance with §004.03 below) until December 22, 1998, when the tank must be upgraded under Chapter 5 or permanently closed under §002 in Chapter 10; and

002.01C. Tanks with capacity of 1000 gallons or less may use weekly tank gauging in accordance with §004.02 below.

002.02. Piping. Underground piping that routinely contains regulated substances must be monitored for releases in a manner that meets one of the following requirements:

002.02A. Pressurized piping. Underground piping that conveys regulated substances under pressure must:

002.02A1. Be equipped with an automatic line leak detector conducted in accordance with §005.01 below; and

002.02A2. Have an annual line tightness test conducted in accordance with §005.02 below or have monthly monitoring conducted in accordance with §005.03 below.

002.02B. Suction piping. Underground piping that conveys regulated substances under suction must either have a line tightness test conducted at least every 3 years and in accordance with §005.02 below, or use a monthly monitoring method conducted in accordance with §005.03 below. No release detection is required for suction piping that is designed and constructed to meet the following standards:

002.02B1. The below-grade piping operates at less than atmospheric pressure;

002.02B2. The below-grade piping is sloped so that the contents of the pipe will drain back into the storage tank if the suction is released;

002.02B3. Only one check valve is included in each suction

line;

002.02B4. The check valve is located directly below and as close as practical to the suction pump; and

002.02B5. A method is provided that allows compliance with §§002.02B2 - 002.02B4 to be readily determined.

003. REQUIREMENTS FOR HAZARDOUS SUBSTANCE UST SYSTEMS.

Owners and operators of hazardous substance UST systems must provide release detection that meets the following requirements:

003.01. Release detection at existing UST systems must meet the requirements for petroleum UST systems in §002 above. By December 22, 1998, all existing hazardous substance UST systems must meet the release detection requirements for new systems in §003.02 below.

003.02. Release detection at new hazardous substance UST systems must meet the following requirements:

003.02A. Secondary containment systems must be designed, constructed and installed to:

003.02A1. Contain regulated substances released from the tank system until they are detected and removed;

003.02A2. Prevent the release of regulated substances to the environment at any time during the operational life of the UST system; and

003.02A3. Be checked for evidence of a release at least every 30 days.

[Note: The provisions of 40 CFR 265.193, Containment and Detection of Releases, may be used to comply with these requirements.]

003.02B. Double-walled tanks must be designed, constructed, and installed to:

003.02B1. Contain a release from any portion of the inner tank within the outer wall; and

003.02B2. Detect the failure of the inner wall.

003.02C. External liners (including vaults) must be designed, constructed, and installed to:

003.02C1. Contain 100 percent of the capacity of the largest tank within its boundary;

003.02C2. Prevent the interference of precipitation or ground-water intrusion with the ability to contain or detect a release of regulated substances; and

003.02C3. Surround the tank completely (i.e., it is capable of preventing lateral as well as vertical migration of regulated substances).

003.02D. Underground piping must be equipped with secondary containment that satisfies the requirements of §003.02A above (e.g., trench liners, jacketing of double-walled pipe). In addition, underground piping that conveys regulated substances under pressure must be equipped with an automatic line leak detector in accordance with §005.01 below.

003.02E. Other methods of release detection may be used if owners and operators:

003.02E1. Demonstrate to the State Fire Marshal that an alternate method can detect a release of the stored substance as effectively as any of the methods allowed in §§004.02 - 004.08 below can detect a release of petroleum;

003.02E2. Provide information to the State Fire Marshal on effective corrective action technologies, health risks, and chemical and physical properties of the stored substance, and the characteristics of the UST site; and,

003.02E3. Obtain approval from the State Fire Marshal to use the alternate release detection method before the installation and operation of the new UST system.

004. METHODS OF RELEASE DETECTION FOR TANKS.

Each method of release detection for tanks used to meet the requirements of §002 above must be conducted in accordance with the following:

004.01. Inventory control. A daily product inventory control system (or another test of equivalent performance) must be utilized which is capable of detecting a release of at least 1.0 percent of flow-through plus 130

gallons on a monthly basis in the following manner (a sample inventory control sheet is included in Appendix A):

004.01A. Inventory volume measurements for regulated substance inputs, withdrawals, and the amount still remaining in the tank are recorded each operating day;

004.01B. The equipment used is capable of measuring the level of product over the full range of the tank's height to the nearest one-eighth of an inch;

004.01C. The regulated substance inputs are reconciled with delivery receipts by measurement of the tank inventory volume before and after delivery;

004.01D. Deliveries are made through a drop tube that extends to within one foot of the tank bottom;

004.01E. Product dispensing is metered and recorded within the local standards for meter calibration or an accuracy of 6 cubic inches for every 5 gallons of product withdrawn; and

004.01F. The measurement of any water level in the bottom of the tank is made to the nearest one-eighth of an inch at least once a month.

004.01G. Inventory shall be reconciled on a monthly basis and reconciled records shall be retained for five years.

[*Note:* Practices described in the American Petroleum Institute Publication 1621, "Recommended Practice for Bulk Liquid Stock Control at Retail Outlets," may be used, where applicable, as guidance in meeting the requirements of this section.]

004.02. Manual tank gauging. Manual tank gauging must meet the following requirements:

004.02A. Tank liquid level measurements are taken at the beginning and ending of a period of time during which no liquid is added to or removed from the tank;

004.02B. Level measurements are based on an average of two consecutive stick readings at both the beginning and ending of the period;

004.02C. The equipment used is capable of measuring the level of

product over the full range of the tank's height to the nearest one-eighth of an inch;

004.02D. A leak is suspected and subject to the requirements of 006.01B of Chapter 6 if the variation between beginning and ending measurements exceeds the weekly or monthly standards in the following table:

<u>Nominal Tank Capacity & Dimensions</u>	<u>Weekly Standard (one test)</u>	<u>Monthly Standard (average of four tests)</u>	<u>Minimum Test Duration</u>
550 gallons or less	10 gallons	5 gallons	36 hours
551-999 gallons	13 gallons	7 gallons	36 hours
1,000 gallons (64" x 73")	9 gallons	4 gallons	44 hours
1,000 gallons (48" x 128")	12 gallons	6 gallons	58 hours
1,001-2,000 gallons	26 gallons	13 gallons	36 hours

004.02E. Tanks of 1,000 gallons or less nominal capacity may use this as the sole method of release detection. Tanks of 2,000 gallons or less may use this method in place of daily inventory control in §004.01 above in combination with tank tightness testing requirements in §002 of this chapter. Tanks of more than 2,000 gallons nominal capacity may not use this method to meet the requirements of this section.

004.03. Tank tightness testing. Tank tightness testing (or another test of equivalent performance) must be capable of detecting a 0.1 gallon per hour leak rate with a probability of detection of 95% and a probability of false alarm no more than 5%. Tank tightness tests must be performed when the tank is at least 95% full, while accounting for the effects of thermal expansion or contraction of the product, vapor pockets, tank deformation, evaporation or condensation, and the location of the water table.

004.03A. The tank tightness test shall be conducted in accordance

with a code or standard of practice developed by a nationally recognized association or independent testing laboratory.

004.03B. The tank tightness test shall be performed by qualified personnel who possess the requisite training, experience and competence to conduct the test properly, who are present at the facility and who maintain responsible oversight throughout the entire testing procedure, and who have been certified by the manufacturer or developer of the testing equipment as being qualified to perform the test. The tank precision test shall be conducted in strict accordance with the testing procedures developed by the system manufacturer or developer.

004.04. Automatic tank gauging. Equipment for automatic tank gauging that tests for the loss of product and conducts inventory control must meet the following requirements:

004.04A. The automatic product level monitor test can detect a 0.2 gallon per hour leak rate from any portion of the tank that routinely contains product; and

004.04B. Inventory control (or another test of equivalent performance) is conducted in accordance with the requirements of §004.01 above.

004.05. Vapor monitoring. Testing or monitoring for vapors within the soil gas of the excavation zone must meet the following requirements:

004.05A. The materials used as backfill are sufficiently porous (e.g., gravel, sand, crushed rock) to readily allow diffusion of vapors from releases into the excavation area;

004.05B. The stored regulated substance, or a tracer compound placed in the tank system, is sufficiently volatile (e.g., gasoline) to result in a vapor level that is detectable by the monitoring devices located in the excavation zone in the event of a release from the tank;

004.05C. The measurement of vapors by the monitoring device is not rendered inoperative by the ground water, rainfall, or soil moisture or other known interferences so that a release could go undetected for more than 30 days;

004.05D. The level of background contamination in the excavation zone will not interfere with the method used to detect releases from the tank;

004.05E. The vapor monitors are designed and operated to detect any significant increase in concentration above background of the regulated substance stored in the tank system, a component or components of that substance, or a tracer compound placed in the tank system;

004.05F. In the UST excavation zone, the site is assessed to ensure compliance with the requirements in section 004.05 of this chapter and to establish the number and positioning of monitoring wells that will detect releases within the excavation zone from any portion of the tank that routinely contains product; and

004.05G. Monitoring wells are clearly marked and secured to avoid unauthorized access and tampering.

004.06. Ground-water monitoring. Testing or monitoring for liquids on the ground water must meet the following requirements:

004.06A. The regulated substance stored is immiscible in water and has a specific gravity of less than one;

004.06B. Ground water is never more than 20 feet from the ground surface and the hydraulic conductivity of the soil(s) between the UST system and the monitoring wells or devices is not less than 0.01 cm/sec (e.g., the soil should consist of gravel, coarse to medium sands, coarse silts or other permeable materials);

004.06B. The slotted portion of the monitoring well casing must be designed to prevent migration of natural soils or filter pack into the well and to allow entry of regulated substance on the water table into the well under both high and low ground-water conditions;

004.06C. Monitoring wells shall be sealed from the ground surface to the top of the filter pack;

004.06D. Monitoring wells or devices intercept the excavation zone or are as close to it as is technically feasible;

004.06E. The continuous monitoring devices or manual methods used can detect the presence of at least one-eighth of an inch of free product on top of the ground water in the monitoring wells;

004.06F. Within and immediately below the UST system excavation zone, the site is assessed to ensure compliance with the requirements in sections 004.06A-004.06E of this chapter and to establish the number and positioning of monitoring wells or

devices that will detect releases from any portion of the tank that routinely contains product; and

004.06G. Monitoring wells are clearly marked and secured to avoid unauthorized access and tampering.

004.06H. Monitoring wells shall be installed and constructed in accordance with Title 178, Chapter 12 Nebraska Administrative Code ("Regulations Governing Water Well Construction, Pump Installation and Water Well Abandonment Standards" - Nebraska Department of Health.)

004.07. Interstitial monitoring. Interstitial monitoring between the UST system and a secondary barrier immediately around or beneath it may be used, but only if the system is designed, constructed and installed to detect a leak from any portion of the tank that routinely contains product and also meets one of the following requirements:

004.07A. For double-walled UST systems, the sampling or testing method can detect a release through the inner wall in any portion of the tank that routinely contains product;

[Note: The provisions outlined in the Steel Tank Institute's "Standard for Dual Wall Underground Storage Tanks" may be used as guidance for aspects of the design and construction of underground steel double-walled tanks.]

004.07B. For UST systems with a secondary barrier within the excavation zone, the sampling or testing method used can detect a release between the UST system and the secondary barrier;

004.07B1. The secondary barrier around or beneath the UST system consists of artificially constructed material that is sufficiently thick and impermeable (at least 10^{-6} cm/sec for the regulated substance stored) to direct a release to the monitoring point and permit its detection;

004.07B2. The barrier is compatible with the regulated substance stored so that a release from the UST system will not cause a deterioration of the barrier allowing a release to pass through undetected;

004.07B3. For cathodically protected tanks, the secondary barrier must be installed so that it does not interfere with the proper operation of the cathodic protection system;

004.07B4. The ground water, soil moisture, or rainfall will not render the testing or sampling method used inoperative so that a release could go undetected for more than 30 days;

004.07B5. The site is assessed to ensure that the secondary barrier is always above the ground water and not in a 25-year flood plain, unless the barrier and monitoring designs are for use under such conditions; and,

004.07B6. Monitoring wells are clearly marked and secured to avoid unauthorized access and tampering.

004.07C. For tanks with an internally fitted liner, an automated device can detect a release between the inner wall of the tank and the liner, and the liner is compatible with the substance stored.

004.08. Other methods. Any other type of release detection method, or combination of methods, can be used if:

004.08A. It can detect a 0.2 gallon per hour leak rate or a release of 150 gallons within a month with a probability of detection of 0.95 and a probability of false alarm of 0.05; or

004.08B. The State Fire Marshal may approve another method if the owner and operator can demonstrate that the method can detect a release as effectively as any of the methods allowed in §§004.03-004.07 of this chapter. In comparing methods, the State Fire Marshal shall consider the size of release that the method can detect and the frequency and reliability with which it can be detected. If the method is approved, the owner and operator must comply with any conditions imposed by the State Fire Marshal on its use to ensure the protection of human health and the environment.

005. METHODS OF RELEASE DETECTION FOR PIPING.

Each method of release detection for piping used to meet the requirements of §002 above must be conducted in accordance with the following:

005.01. Automatic line leak detectors. Methods which alert the operator to the presence of a leak by restricting or shutting off the flow of regulated substances through piping or triggering an audible or visual alarm may be used only if they detect leaks of 3 gallons per hour at 10 pounds per square inch line pressure within 1 hour. An annual test of the operation of the leak detector must be conducted in accordance with the

manufacturer's requirements.

005.02. Line tightness testing. A periodic test of piping may be conducted only if it can detect a 0.1 gallon per hour leak rate at one and one-half times the operating pressure.

005.03. Applicable tank methods. Any of the methods in sections 004.05 - 004.07 of this chapter may be used if they are designed to detect a release from any portion of the underground piping that routinely contains regulated substances.

006. RELEASE DETECTION RECORD KEEPING.

All UST system owners and operators must maintain records in accordance with §006 in Chapter 6 demonstrating compliance with all applicable requirements of this chapter. The records must include the following:

006.01. All written performance claims pertaining to any release detection system used, and the manner in which these claims have been justified or tested by the equipment manufacturer or installer, must be maintained for 5 years, or for another reasonable period of time determined by the State Fire Marshal, from the date of installation.

006.02. The results of any sampling, testing, or monitoring must be maintained for at least 5 years, except that the results of tank tightness testing conducted in accordance with §004.03 of this chapter must be retained until the next test is conducted; and

006.03. Written documentation of all calibration, maintenance, and repair of release detection equipment permanently located on-site must be maintained for at least one year after the servicing work is completed, or for another reasonable time period determined by the State Fire Marshal. Any schedules of required calibration and maintenance provided by the release detection equipment manufacturer must be retained for 5 years from the date of installation.

Legal Citation: Title 159, Chapter 7

Nebraska State Fire Marshal